## REMARKS

Claims 1, 13 – 14, 16 and 28 – 29 have been amended.

Claims 30 – 31 have been added.

Claims 1 – 31 are present in the subject application.

In the Office Action mailed June 4, 2004, the Examiner has rejected claims 1 – 6, 8 – 9, 11, 13 – 14, 16 – 22, 24, 26 and 28 – 29 under 35 U.S.C. §102(b) and has rejected claims 7, 10, 12, 15, 23, 25 and 27 under U.S.C. §103(a). Reconsideration of the subject application is respectfully requested in view of the following remarks.

The Examiner has rejected claims 1 – 6, 8 – 9, 11, 13 – 14, 16 – 22, 24, 26 and 28 – 29 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,659,090 (Kustanovich). Briefly, the present invention is directed toward a target assembly for use with soft-air type guns and including an impact detection device. The device overlays an intended target and transfers projectile impact information to a computer system to display the projectile impact location on an image of the target and/or interact with a gaming application. The detection device permits the soft air firearm to be utilized with various virtual targets (e.g., generated by software gaming, competition or training applications, etc.) and with a variety of paper or other targets.

The Examiner takes the position that the Kustanovich patent discloses the features recited in these claims. However, this rejection is respectfully traversed and, in order to expedite prosecution of the subject application, independent claims 1 and 16 have been amended to define various features of the present invention. In particular, independent claims 1 and 16 recite the features of: the plurality of layers including an electrically conducting sensor layer with an electrical property including one of resistance and capacitance that changes in response to the impact from the projectile and a resilient material layer coupled to the sensor layer and

deforming in response to the projectile impact to facilitate the electrical property changes of the sensor layer; and monitoring the electrical property of the sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property. Claims 13 – 14 and 28 – 29 have been amended for consistency with their amended parent claims.

The Kustanovich patent does not disclose, teach or suggest each and every feature recited in independent claims 1 and 16. For example, independent claims 1 and 16 recite the feature of monitoring the electrical property of the sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property as discussed above. In contrast, the Kustanovich patent discloses an electrical target, where the target surface is divided into four target areas, namely a central area representing a bulls-eye and three annular areas of increasing diameter and all circumscribing the bulls-eye central area (e.g., See Column 2, lines 25 – 30). The electrical target is constructed of three continuously-conductive electrode layers, three selectively-conductive electrode layers and five dielectric layers (e.g., See Column 2, lines 34 – 44). The dielectric layers are interposed between adjacent electrode layers and are of compressively-deformable material which, upon impact by an object, compress under the force of the impact and thereby change the electrical impedance between the respective electrode layers (e.g., See Column 3, lines 14 – 19). The three continuously-conductive electrode layers are all connected to a common lead leading to a first terminal, while annular areas of the three selectively-conductive electrode layers are connected to another common lead leading to a second terminal. The central areas of the three continuously-conductive electrode layers are connected to a common third lead leading to a third terminal. The capacitance between terminals is measured by measuring circuits (e.g., See

Column 3, lines 29 – 42). A processor processes the outputs of the measuring circuits and produces an output representing the change in capacitance C1 (capacitance between the first and second terminals) divided by the sum of the capacitance changes of both C1 and C2 (capacitance between the first and third terminals) which is fed to a display (e.g., See Column 3, lines 43 – 54). The change in capacitances relative to each other depends on the location of the object impact on the target. Thus, if the impact is within the bulls-eye central area, the display displays the maximum reading indicating the bulls eye area. If the object impacts the target within an annular area, the display will represent a lower value than the bulls-eye. When the impact is within a further annular area, the output of display will further decrease. Thus, the Kustanovich patent discloses determination of an area within the target (i.e., the particular annular or bulls-eye area impacted on the target), as opposed to determining location coordinates of the projectile impact on the impact device surface as recited in the independent claims. Since the Kustanovich patent does not disclose, teach or suggest the features recited in independent claims 1 and 16 as discussed above, these claims are considered to be in condition for allowance.

Claims 2 – 6, 8 – 9, 11, 13 – 14, 17 – 22, 24, 26 and 28 – 29 depend either directly or indirectly from independent claims 1 or 16 and include all the limitations of their parent claims. These dependent claims are considered to be in condition for allowance for substantially the same reasons discussed above in relation to their parent claims and for further limitations recited in the dependent claims. New claims 30 and 31 depend from independent claims 1 and 16, respectively, and are similarly considered to be in condition for allowance.

The Examiner has rejected claims 7 and 23 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,659,090 (Kustanovich) in view of U.S. Patent No. 4,305,142

(Springer). Briefly, the present invention is directed toward a target assembly to determine projectile impact information as described above.

The Examiner takes the position that the Kustanovich patent discloses all the claimed subject matter, except for the impact device being transparent. The Examiner further alleges that the Springer patent teaches this feature and that it would have been obvious to one of ordinary skill in the art to combine the teachings of the Kustanovich and Springer patents to attain the claimed invention.

This rejection is respectfully traversed. Initially, claims 7 and 23 depend, either directly or indirectly, from independent claims 1 and 16, respectively, and include all the limitations of their parent claims. As discussed above, the Kustanovich patent does not disclose, teach or suggest the feature of monitoring the electrical property of the sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property. The Springer patent does not compensate for the deficiencies of the Kustanovich patent and similarly does not disclose, teach or suggest this feature. Rather, the Springer patent discloses a ballistic impact sensing and display system with a plurality of sensors placed around a target area that detect a shock wave created by the impact or passage of a ballistic projectile. The sensors drive electronic timing means that record the time intervals between activation of the sensors by the propagating shock wave. Storage registers within the timing means drive a gridwork of display buses arranged along hyperbolic curves. A matrix of indicators bridging the points of intersection of the hyperbolic buses display the compartment within the target area in which the impact occurred (e.g., See Abstract). Thus, the Springer patent discloses determination of the point of impact based on a shock wave propagated by the impact of the projectile, as opposed to monitoring the electrical property of the

sensor layer and determining location coordinates of the impact upon the impact device surface based on changes of the sensor layer electrical property as recited in the claims. Since the Kustanovich and Springer patents, either alone or in combination, do not disclose, teach or suggest the features recited in claims 7 and 23 as discussed above, these claims are considered to be in condition for allowance.

The Examiner has rejected claims 10, 15 and 25 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,659,090 (Kustanovich) in view of U.S. Patent No. 6,146,142 (Nuutinen). Briefly, the present invention is directed toward a target assembly determining projectile impact information as described above.

The Examiner takes the position that the Kustanovich patent discloses all the claimed subject matter, except for calibrating the determined impact location to account for environmental conditions. The Examiner further alleges that the Nuutinen patent teaches this feature and that it would have been obvious to one of ordinary skill in the art to combine the teachings of the Kustanovich and Nuutinen patents to attain the claimed invention.

This rejection is respectfully traversed. Initially, claims 10, 15 and 25 depend, either directly or indirectly, from independent claims 1 or 16, and, therefore, include all the limitations of their parent claims. As discussed above, the Kustanovich patent does not disclose, teach or suggest monitoring the electrical property of the sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property. The Nuutinen patent does not compensate for the deficiencies of the Kustanovich patent and similarly does not disclose, teach or suggest this feature. Rather, the Nuutinen patent discloses an apparatus for developing shooting skills that takes into account the effects of wind on the trajectory of a bullet. The apparatus includes at least one wind indicator

for measuring force and direction of the wind. A central unit is provided to allow entry of basic shooting data. The central unit also collects and analyzes the measured force and direction of the wind with the entered data. The data analyzed by the central unit is transmitted to the marksman through a terminal which tells the marksman what effects the wind will have on the trajectory of the bullet (e.g., See Abstract). Thus, the Nuutinen patent does not disclose, teach or suggest determining locations where the target surface receives actual projectile impacts or, for that matter, monitoring the electrical property of the sensor layer and determining location coordinates of a projectile impact upon an impact device surface based on changes of the sensor layer electrical property as recited in the claims. Since the Kustanovich and Nuutinen patents, either alone or in combination, do not disclose, teach or suggest the features recited in claims 10, 15 and 25 as discussed above, these claims are considered to be in condition for allowance.

The Examiner has rejected claims 12 and 27 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,659,090 (Kustanovich) in view of U.S. Patent No. 5,349,853 (Oehler). Briefly, the present invention is directed toward a target assembly determining projectile impact information as described above.

This rejection is respectfully traversed. Initially, claims 12 and 27 depend, either directly or indirectly, from independent claims 1 and 16, respectively, and include all the limitations of their parent claims. As discussed above, the Kustanovich patent does not disclose, teach or suggest monitoring the electrical property of the sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property. The Oehler patent does not compensate for the deficiencies of the Kustanovich patent and similarly does not disclose, teach or suggest this feature. Rather, the Oehler patent discloses an apparatus for measuring the pressure in a firearm-firing chamber and

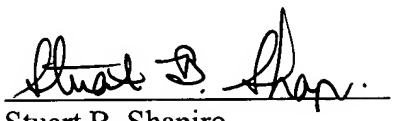
for measuring and calculating exterior and interior ballistics of a projectile (e.g., See Column 8, lines 53 – 58). A downrange acoustic target includes sensing means arranged at the corners of a triangular support frame. The sensing means comprise three microphones (e.g., See Column 12, lines 23 – 34). A projectile passing through the target region at the hit point produces acoustic energy which is received by the microphones at three different times (e.g., See Column 13, lines 2 – 5). Alternatively, downrange bullet sensors (e.g., photodetectors, acoustic and electromagnetic sensors) may be used in a downrange location in lieu of the acoustic target (e.g., See Column 11, lines 33 - 39 and Column 13, lines 54 – 56). The information from the acoustic target sensors or bullet sensors are utilized to determine the hit location (e.g., See Column 16, lines 59 – 64). Thus, the Oehler patent discloses measuring projectile impact locations on a target based on acoustic energy or other sensors (photodetectors, electromagnetic sensors), as opposed to monitoring the electrical property of a sensor layer and determining location coordinates of the projectile impact upon the impact device surface based on changes of the sensor layer electrical property as recited in the claims. Since the Kustanovich and Oehler patents, either alone or in combination, do not disclose, teach or suggest the features recited in claims 12 and 27 as discussed above, these claims are considered to be in condition for allowance.

In addition to the foregoing, it would not be obvious to combine the teachings of the Kustanovich, Springer, Nuutinen and Oehler patents to attain the claimed invention. Initially, the Kustanovich patent is directed to an electrical device capable of indicating the force and/or location of an impact. This device utilizes several continuously and selectively conductive electrode layers to determine an area on the target which was impacted. The Nuutinen patent is directed toward measuring wind conditions and apparently has no relation to measuring impact

locations on a target. Further, the Oehler and Springer patents detect impact locations based on measurement of a shock wave or acoustic energy, and do not employ targets with various layers having varying conductive properties to detect the impact location. Thus, the patents are directed toward diverging applications and/or employ unrelated techniques to measure projectile impact locations on a target. Accordingly, there is no reason, suggestion or motivation to combine their teachings and the proposed combinations of the Kustanovich, Springer, Nuutinen and Oehler patents do not render the claimed invention obvious.

The application, having been shown to overcome the issues raised in the Office Action, is considered to be in condition for allowance and a Notice of Allowance is earnestly solicited.

Respectfully Submitted,



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